Amendments To The Claims

This listing of claims will replace all prior versions, and listings of claims in the application.

Please amend claims 1-5, 12, 31-35, 41, 56, 58 and 60 as follows:

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1. (Currently Amended) A method of storing data in a database, [the method] comprising [the steps of]:

obtaining both a protocol encoded raw form of a data to be stored and a syntax-[normalised] normalized form of said data; and

storing concurrently in at least two tables both the syntax-[normalised] normalized form and the protocol encoded raw form of said data.

2. (Currently Amended) A method of storing data in a database, as claimed in claim 1, wherein said obtaining [step] comprises:

first obtaining a protocol encoded raw form of a data and thereafter generating said syntax-[normalised] normalized form from said protocol encoded raw form of the data.

3. (Currently Amended) A method of storing data in a database, as claimed in claim 1, wherein said storing [step] comprises:

maintaining both the syntax-[normalised] normalized form and the protocol encoded raw form of the data for data base searching and data retrieval.

4. (Currently Amended) A method of storing data in a database, as claimed in claim 3, wherein said maintaining [step] comprises maintaining said protocol encoded raw form and syntax-[normalised] normalized form of a data in at least two tables [concurrently].

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5. (Currently Amended) A method of storing data in a database, as claimed in claim 4, wherein said maintaining [step] further comprises correlating the storage location of said protocol encoded raw form and said normalized form in said at least [one] two tables.

6. (Withdrawn) A method of storing data in a database, as claimed in claim 2, wherein said generating step comprises:

applying directory service attribute syntax rules to the raw data.

7. (Withdrawn) A method of enabling data to be arranged and/or stored in a database used in a directory service system, the method including the steps of:

a. applying directory service attribute syntaxes rules to the data, and

b. creating a normalised form of the data.

8. (Withdrawn) A method of enabling data to be arranged and/or stored in a database as claimed in claim 7, further comprising:

c. storing said data and the normalised form of the data concurrently in at least one table.

9. (Withdrawn) A method of enabling data to be arranged and/or stored in a database as claimed in clam 8, wherein said at least one table comprises a plurality of columns and a plurality of rows, and said storing step comprises storing said data and said normalised form of the data in related locations.

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10. (Withdrawn) A method of enabling data to be arranged and/or stored in a database as claimed in claim 9, wherein said locations in a table are related by being in a common row.

11. (Withdrawn) A method of enabling data to be arranged and/or stored in a database as claimed in claim 8, wherein said at least one table comprises a HIERARCHY table and an OBJECT table.

12. (Currently Amended) A method of locating data in a database, wherein said data is stored in at least two tables in a protocol encoded raw form and linked to a concurrently stored syntax-[normalised] normalized form of the data, comprising [the step of]:

locating said protocol encoded raw data by searching on said syntax-[normalised] normalized form of the data.

13. (Withdrawn) A method of locating data in a database, as claimed in claim 12, wherein said searching is performed using SQL.

14. (Withdrawn) A method of locating data in a database, as claimed in claim 12, wherein said searching is performed on an OBJECT table, comprising a plurality of columns and a plurality of rows.

15. (Withdrawn) A method of locating data in a database, as claimed in claim 14, further comprising for a data entry:

specifying an attribute ID (AID), said AID being stored in a first one of said plurality of

columns and in a predetermined row;

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storing an entry ID (EID), said EID being stored in a second one of said plurality of columns and in said predetermined row;

storing a normalised form of said data entry in a third one of said plurality of columns and in said predetermined row.

16. (Withdrawn) A method of formatting a find request for a database having stored therein objects including attributes each having a type and value(s), the method including:

a. creating a database representation of the type (AID), and

b. creating a database representation of the value(s) (NORM).

17. (Withdrawn) A method as claimed in claim 16, wherein step a. is performed by looking up an ATTRIBUTE table.

18. (Withdrawn) A method as claimed in claim 16, wherein step b. is performed by applying syntax normalization.

19. (Withdrawn) A method of locating objects stored in a database, the method comprising the step of applying AID and NORM to determine a matching object (EID), wherein the method of claim 16 is used to determine AID and / or NORM

20. (Withdrawn) A method of locating objects stored in a database, the method comprising the step of applying AID and NORM to determine a matching object (EID), wherein the method of claim 17 is used to determine AID and / or NORM

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21. (Withdrawn) A method of locating objects stored in a database, the method comprising the step of applying AID and NORM to determine a matching object (EID), wherein the method of claim 18 is used to determine AID and / or NORM

22. (Withdrawn) A method of locating objects stored in a database, the method comprising the step of applying AID and NORM to determine a matching object (EID).

23. (Withdrawn) A method as claimed in claim 22 wherein the step of applying is performed using SQL.

24. (Withdrawn) A method of retrieving contents of object(s) from a database, the method including the step of:

a. finding row(s) which match a predetermined EID(s).

25. (Withdrawn) A method as claimed in claim 24, further including the step of:

b. returning from the row(s), EID, AID and a raw form.

26. (Withdrawn) A method as claimed in claim 25, further including the step of:

c. converting the result of step b. into objects containing attribute(s), each attribute having a type and value(s).

27. (Withdrawn) A method of providing data as an output from a database, the output being in response to a directory service/query, the method comprising the steps of:

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processing said directory service/query to identify said data in the database; and

providing as the output, a raw form of the data.

28. (Withdrawn) A method of providing data as an output from a database, as claimed in claim 27, wherein said processing step is based on other than said raw data.

29. (Withdrawn) A method of providing data as an output from a database, as claimed in claim 28, wherein said processing step comprises a comparison of data directly corresponding to said raw data but in normalised form.

30. (Withdrawn) In a directory service system, having a database in which data is stored in a first form, and a second form, being a normalised form, a method of transferring data into and out of the database, the method including the steps of:

finding data in the database using a normalised form; and

transferring data out of the database using a raw form.

31. (Currently Amended) A database apparatus comprising:

means for obtaining both a protocol encoded raw form of a data to be stored and a syntax-[normalised] normalized form of said data; and

a storage medium for storing concurrently in at least two tables both the syntax-[normalised] normalized form and the protocol encoded raw form of said data.

32. (Currently Amended) A database apparatus for storing data in a database, as claimed in claim 31, wherein said means for obtaining comprises:

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means for first obtaining a protocol encoded raw form of a data and thereafter generating said syntax-[normalised] normalized form from said protocol encoded raw form of the data.

33. (Currently Amended) A database apparatus for storing data in a database. As claimed in claim 31, wherein said storage medium is operative to maintain both the syntax-[normalised] normalized form and the protocol encoded raw form of the data for data base searching and data retrieval.

34. (Currently Amended) A database apparatus for storing data in a database, as claimed in claim 33, wherein said storage medium is operative to maintain said protocol encoded raw form and syntax-[normalised] normalized form of a data in at least two tables .

35. (Currently Amended) A database apparatus for storing data in a database, as claimed in claim 34, wherein said

storage locations of said protocol encoded raw form and said syntax-[normalised] normalized form of data are correlated in said at least two tables.

36. (Withdrawn) A database apparatus for storing data in a database, as claimed in claim 32, further comprising:

means for applying directory service attribute syntax rules to the raw data.

37. (Withdrawn) An apparatus for enabling data to be arranged and/or stored in a database used in a directory service system, comprising:

a. means for applying directory service attribute syntaxes rules to the data;

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b. means for creating a normalised form of the data; and

c. means for storing said data and the normalised form of the data concurrently in at least one table.

38. (Withdrawn) An apparatus for enabling data to be arranged and/or stored in a database as claimed in claim 37, wherein said at least one table comprises a plurality of columns and a plurality of rows, and said storing step comprises storing said data and said normalised form of the data in related locations.

39. (Withdrawn) An apparatus for enabling data to be arranged and/or stored in a database as claimed in claim 38, wherein said locations in a table are related by being in a common row.

40. (Withdrawn) An apparatus for enabling data to be arranged and/or stored in a database as claimed in claim 37 wherein said at least one table comprises a HIERARCHY table and an OBJECT table.

41. (Currently Amended) An apparatus for locating data in a database, wherein said data is stored in [a] at least two tables in a protocol encoded raw form and linked to a concurrently stored syntax-[normalised] normalized form of the data, comprising:

means for locating said protocol encoded raw form of the data by searching on said syntax-[normalised] normalized form of the data.

42. (Withdrawn) An apparatus for locating data in a database, as claimed in claim 41

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43. (Withdrawn) An apparatus for locating data in a database, as claimed in claim 41, wherein said searching is performed on an OBJECT table, comprising a plurality of columns and a plurality of rows.

44. (Withdrawn) An apparatus for formatting a find request for a database having stored therein objects including attributes each having a type and value(s), the apparatus including:

a. means for creating a database representation of the type (AID), and

b. means for creating a database representation of the value(s) (NORM).

45. (Withdrawn) An apparatus as claimed in claim 4,, wherein said means for creating is operative to create a representation by looking up an ATTRIBUTE table.

46. (Withdrawn) An apparatus as claimed in claim 45, wherein said means for creating is operative to create the data base representation by a means for applying syntax normalization.

47. (Withdrawn) An apparatus as claimed in claim 44 is operative to determine AID and / or NORM.

48. (Withdrawn) An apparatus as claimed in claim 45 is operative to determine AID and / or NORM.

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49. (Withdrawn) An apparatus as claimed in claim 46 is operative to determine AID and / or NORM.

50. (Withdrawn) An apparatus as claimed in claims 46, wherein the means for applying uses SQL.

51. (Withdrawn) An apparatus for locating objects stored in a database, the apparatus comprising means for applying AID and NORM to determine a matching object (EID).

52. (Withdrawn) An apparatus as claimed in claim 51, wherein the means for applying uses SQL.

53. (Withdrawn) An apparatus for retrieving contents of object(s) from a database, the apparatus comprising:

a. means for finding row(s) which match a predetermined EID(s).

54. (Withdrawn) An apparatus as claimed in claim 53, further comprising:

b. means for returning from the row(s), EID, AID and a raw form.

55. (Withdrawn) An apparatus as claimed in claim 54, further comprising:

c. means for converting the output of the means for returning into objects containing attribute(s), each attribute having a type and value(s).

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56. (Currently Amended) In a directory service system, having a database in which data is stored in at least two tables in a first form, being a protocol encoded raw form, and a second form, being a syntax-[normalised] normalized form, apparatus for transferring data into and out of the database, comprising:

means for finding data in the database using a syntax-[normalised] normalized form; and

means for transferring data out of the database using a protocol encoded raw form.

57. (Previously Amended) A computer program product, including a storage medium for storing a computer program, the computer program being executable to perform a method as claimed in any one of claims 1-5.

58. (Currently Amended) A method as claimed in any one of claims 1-[6]5 [and 27-29] wherein the protocol encoded raw form of data is stored in ASN.1 format.

59. (Withdrawn) A directory service system as claimed in any one of claims 30 and 56 wherein the raw form of data is stored in ASN.1 format.

60. (Currently Amended) An apparatus as claimed in any one of claims 31-[43]35 and 41 wherein said protocol encoded raw data or data is stored in ASN.1 format.

61. (Previously Cancelled)